

## **ADDENDUM NO. 6**

CITY OF SAN ANTONIO

CAPITAL IMPROVEMENTS MANAGEMENT SERVICES

PROJECT NAME: **Market Street Realignment**

DATE: 2/11/2013

This addendum should be included in and be considered part of the plans and specifications for the Market Street Realignment Project. The contractor shall be required to sign an acknowledgement of the receipt of this addendum and submit it with their bid.

PROJECT NO.: **40-00300**

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### **GENERAL:**

- **Receipt of Addendum No. 6 Acknowledgement.** Date of Bid has been updated to be TUESDAY, FEBRUARY 12, 2013 AT 2:00 P.M. C.S.T..

### **Updated SAWS Special Specification**

- **SAWS Technical Specification 336313.** Updated highlighted text and removed text shown with strike-through.

**CITY OF SAN ANTONIO  
DEPARTMENT OF CAPITAL IMPROVEMENTS MANAGEMENT SERVICES  
CONTRACT SERVICES DIVISION**

RECEIPT OF ADDENDUM NUMBER **6** IS HEREBY ACKNOWLEDGED FOR PLANS  
AND SPECIFICATIONS FOR CONSTRUCTION OF **Market Street Realignment** FOR  
WHICH BIDS WILL BE OPENED ON TUESDAY, FEBRUARY 12, 2013 AT 2:00 P.M.  
C.S.T.

THIS ACKNOWLEDGEMENT MUST BE SIGNED AND RETURNED WITH THE BID  
PACKAGE.

Company Name: \_\_\_\_\_

Address: \_\_\_\_\_

City/State/Zip Code: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Print Name/Title: \_\_\_\_\_

## **SECTION 336313**

### **UNDERGROUND CHILLED WATER DISTRIBUTION PIPING**

#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### **1.2 SUMMARY**

- A. Section includes underground piping outside the building for distribution of chilled water.

##### **1.3 DEFINITIONS**

- A. HP Systems: High-pressure piping operating at more than 15 psig as required by ASME B31.1.
- B. LP Systems: Low-pressure piping operating at 15 psig or less as required by ASME B31.9.

##### **1.4 PERFORMANCE REQUIREMENTS**

- A. Provide components and installation capable of producing chilled water piping systems with the minimum working-pressure ratings of 200 psi.

##### **1.5 ACTION SUBMITTALS**

- A. Product Data: For the following:
  - 1. Conduit piping.
  - 2. Loose-fill insulation in accordance with ASTM D-1895. (Alternate)
- B. Shop Drawings: For underground chilled water distribution piping. Signed and sealed by a qualified professional engineer.
  - 1. Calculate requirements for expansion compensation for underground piping.
  - 2. ~~Show expansion compensators, offsets, and loops with appropriate materials to allow piping movement in the required locations.~~ Show anchors and guides that restrain piping movement with calculated loads, and show concrete thrust block dimensions.
  - 3. Show pipe sizes, locations, and elevations. Show piping in trench with details showing clearances between piping, and show insulation thickness.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from ~~steam~~ chilled water distribution piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.
- B. Profile Drawings: Show system piping in elevation. Draw profiles at horizontal scale of 1 inch equals 20 feet and at vertical scale of 1 inch equals 10 feet. Indicate vaults and piping. Show types, sizes, materials, and elevations of other utilities crossing distribution piping.
- C. Qualification Data: For qualified Installer.
- D. Welding certificates.
- E. Material Test Reports: For conduit piping.
- F. Source quality-control reports.
- G. Field quality-control reports.

## 1.7 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX.
  - 1. Comply with provisions in ASME B31.9, "Building Services Piping."
  - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- B. ASME Compliance: Comply with ASME B31.9, "Building Services Piping" for materials, products, and installation.
- C. ASME Compliance: Safety valves and pressure vessels shall bear appropriate ASME labels.

## 1.8 PROJECT CONDITIONS

- A. Interruption of Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify Owner no fewer than 14 days in advance of proposed interruption of utility.
  - 2. Do not proceed with interruption of utility without Owner's written permission.

## 1.9 COORDINATION

- A. Coordinate pipe-fitting pressure classes with products specified in related Sections.

## **PART 2 - PRODUCTS**

### **2.1 STEEL PIPES AND FITTINGS**

- A. Steel Pipe shall be shall be ASTM 53, Grade B, standard weight, 200 psi, 0.25 inch minimum wall thickness, polyurethane AWWA C222 or epoxy per C210 lined interior, per AWWA C210, 1 mm exterior prime-coat or 8 to 12 mils liquid epoxy coating.
- B. Steel Welding Fittings: ASME B16.9, seamless or welded.
  - 1. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- C. Nipples: ASTM A 733, Standard Weight, seamless, carbon-steel pipe complying with ASTM A 53/A 53M.
- D. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
  - 1. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
    - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
    - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
- E. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

### **2.2 CONDUIT PIPING SYSTEM INSULATION JACKET**

~~A. Conduit Piping System: Factory fabricated and assembled, airtight and watertight, drainable, pressure tested piping with conduit, inner pipe supports, and insulated carrier piping. Fabricate so insulation can be dried in place by forcing dry air through conduit.~~

- A. Insulation jacket shall be seamless high density polyethylene (HDPE) over the insulation for maximum insulation protection from the environment.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Insul-Tek Piping Systems, Inc.
    - b. Perma-Pipe, Inc.
    - c. Rovanco Piping Systems, Inc.
    - d. Thermacor Process, L.P.

- B. Carrier Pipe: Material as indicated in "Piping Application" Article.

Carrier Pipe Insulation:

**UTILITIES**

- ~~1. Calcium Silicate Pipe Insulation: Flat, curved, and grooved block sections of noncombustible, inorganic, hydrous calcium silicate with a non-asbestos fibrous reinforcement. Comply with ASTM C 533, Type I.~~
  - ~~a. Bands: ASTM A 666, Type 304, stainless steel, 3/4 inch wide, 0.020 inch thick.~~
1. Polyisocyanurate Foam Pipe Insulation: Un-faced, preformed, rigid cellular polyisocyanurate material intended for use as thermal insulation.
  - a. Comply with ASTM C 591, Type I or Type IV, except thermal conductivity (k-value) shall not exceed 0.19 Btu x in./h x sq. ft. x deg F at 75 deg F after 180 days of aging.
  - b. Flame-spread index shall be 25 or less and smoke-developed index shall be 50 or less for thickness up to 1-1/2 inches as tested by ASTM E 84.
  - c. Fabricate shapes according to ASTM C 450 and ASTM C 585.
2. Polyurethane Foam Pipe Insulation: Un-faced, preformed, rigid cellular polyurethane material intended for use as thermal insulation.
  - a. Comply with ASTM C 591, Type I or Type IV, except thermal conductivity (k-value) shall not exceed 0.19 Btu x in./h x sq. ft. x deg F at 75 deg F after 180 days of aging.
  - b. Flame-spread index shall be 25 or less and smoke-developed index shall be 50 or less for thickness up to 1-1/2 inches as tested by ASTM E 84.
  - c. Fabricate shapes according to ASTM C 450 and ASTM C 585.

**C. Minimum Clearance:**

- ~~1. Between Carrier Pipe Insulation and Conduit: 1 inch.~~
- ~~1. Between Insulation of Multiple Carrier Pipes: 3/16 inch.~~
- ~~2. Between Bottom of Carrier Pipe Insulation and Conduit: 1 inch.~~
- ~~2. Between Bottom of Bare, Carrier Pipe and Casing: 2 inches.~~

**D. Conduit: Spiral wound, steel.**

- ~~1. Finish: With two coats of fusion-bonded epoxy, minimum 40 mils thick.~~
- ~~2. Cover: With polyurethane foam insulation with an HDPE jacket; thickness indicated in "Piping Application" Article.~~
- ~~3. Piping Supports within Conduit: Corrugated galvanized steel with a maximum spacing of 10 feet.~~
- ~~3. Fittings: Factory fabricated and insulated elbows and tees. Elbows may be bent pipe equal to carrier pipe. Tees shall be factory fabricated and insulated, and shall be compatible with the carrier pipe.~~
- ~~4. Expansion Offsets and Loops: Size casing to contain piping expansion.~~
- ~~4. Accessories include the following:~~
  - ~~a. Guides and Anchors: Steel plate welded to carrier pipes and to casing, complete with vent and drainage openings inside casing.~~

**UTILITIES**

- ~~b. End Seals: Steel plate welded to carrier pipes and to casing, complete with drain and vent openings on vertical centerline.~~
  - ~~c. Gland Seals: Packed stuffing box and gland follower mounted on steel plate, welded to end of casing, permitting axial movement of carrier piping, with drain and vent connections on vertical centerline.~~
  - ~~b. Joint Kit: Half shell, pourable or split insulation and shrink wrap sleeve.~~
- ~~E. Source Quality Control: Factory test the conduit to 15 psig for a minimum of two minutes with no change in pressure. Factory test the carrier pipe to 150 percent of the operating pressure of system. Furnish test certificates.~~

**2.2 LOOSE-FILL INSULATION (Alternate)**

- A. Granular, Loose-Fill Insulation: Inorganic, nontoxic, nonflammable, sodium potassium aluminum silicate with calcium carbonate filler. Include chemical treatment that renders insulation hydrophobic.
- 1. Manufacturers: Subject to compliance with requirements:
    - a. Gilsulate International, Inc.
  - 2. Thermal Conductivity (k-Value): 0.60 at 175 deg F and 0.65 at 300 deg F.
  - 3. Application Temperature Range: 35 to 800 deg F.
  - 4. Dry Density: 40 to 42 lb/cu. ft.
  - 5. Strength: 12,000 lb/sq. ft.

**PART 3 - EXECUTION**

**3.1 EARTHWORK**

- A. See SAWS construction specification Item 804 – Excavation, Trenching and Backfill.

**3.2 PIPING APPLICATION**

- A. Chilled Water Piping:

- 1. 20" diameter pipe and larger shall be ASTM 53, Grade B, standard weight, 200 psi, 0.25 inch minimum wall thickness, polyurethane AWWA C222 or epoxy per C210 lined interior, per AWWA C210, 1 mm exterior prime-coat or 8 to 12 mils liquid epoxy coating.
- 2. 30" diameter pipe shall conform to AWWA C200 and AWWA M-11, 200 psi, 0.25 inch wall, polyurethane AWWA C222 or epoxy per C210 lined interior, 1 mm exterior prime coat or 8 to 12 mils liquid epoxy coating.
- 3. Provide factory pre-insulated fitting of forged, long radius bends, beveled for butt welding, having a wall thickness equal to the pipe.

4. Piping Insulation Thickness: 2 inches.

5. Piping with granular, loose-fill insulation (Alternate).

### 3.3 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. ~~Indicate piping locations and arrangements if such were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations.~~ Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Remove standing water in the bottom of trench.
- C. Bed the pipe on a minimum 6-inch layer of granular fill material with a minimum ~~6~~12-inch clearance between the pipes.
- D. Do not insulate piping or backfill piping trench until field quality-control testing has been completed and results approved.
- ~~E. Install piping at uniform grade of 0.2 percent downward in direction of flow or as indicated.~~
- ~~F. In conduits, install drain valves at low points and manual air vents at high points.~~
- E. Install components with pressure rating equal to or greater than system operating pressure.
- F. Install piping free of sags and bends.
- G. Install fittings for changes in direction and branch connections.
- H. Secure anchors with concrete thrust blocks. Concrete is specified in SAWS Item 300 – Concrete (Natural Aggregate).

### 3.4 LOOSE-FILL INSULATION INSTALLATION (Alternate)

- A. Do not disturb the bottom of trench; otherwise, compact and stabilize it to ensure proper support.
- B. Remove standing water in the bottom of trench.
- C. Bed the pipe on a minimum 6-inch layer of granular fill material with a minimum 6-inch clearance between the pipes.
- D. Form insulation trench by excavation or by installing drywall side forms to establish the required height and width of the insulation.



- E. Support piping with proper pitch, separation, and clearance to backfill or side forms using temporary supporting devices that can be removed after back filling with insulation.
- F. Place insulation and backfill after field quality-control testing has been completed and results approved.
- G. Apply bitumastic coating to carbon-steel anchors and guides. Pour concrete thrust blocks and anchors. See SAWS HEM 300 – Concrete (Natural Aggregate) for concrete and reinforcement.
- H. Wrap piping at expansion loops and offsets with mineral-wool insulation of thickness appropriate for calculated expansion amount.
- I. Pour loose-fill insulation to required dimension agitating insulation to eliminate voids around piping.
- J. Remove temporary hangers and supports.
- K. Cover loose-fill insulation with polyethylene sheet a minimum of 4 mils thick, and empty loose-fill insulation bags on top.
- L. Manually backfill 6 inches of clean backfill. If mechanical compaction is required, manually backfill to 12 inches before using mechanical-compaction equipment.

### 3.5 JOINT CONSTRUCTION

- A. See Section 330500 "Common Work Results for Utilities" for basic piping joint construction.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welding operators according to "Quality Assurance" Article.
- E. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- F. Conduit Piping Joints: Assemble sections and finish joints with pourable or split insulation, exterior jacket sleeve, and apply shrink-wrap seals.

### 3.6 IDENTIFICATION

- A. Install continuous plastic underground warning tapes during back filling of trenches for underground chilled water distribution piping. Locate tapes 6 to 8 inches below finished grade, directly over piping.

### 3.7 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- D. Tests and Inspections:
  - 1. Prepare chilled water piping for testing according to ASME B31.1 and ASME B31.9 and as follows:
    - a. Leave joints, including welds, un-insulated and exposed for examination during test.
    - b. Isolate equipment. Do not subject equipment to test pressure.
    - c. Install relief valve set at pressure no more than one-third higher than test pressure.
    - d. Fill system with temperature water. Where there is risk of freezing, air or a safe, compatible liquid may be used.
    - e. Use vents installed at high points to release trapped air while filling system. Use drip legs installed at low points for complete removal of liquid.
  - 2. Test chilled water piping as follows:
    - a. Subject ~~steam and condensate~~ chilled water piping to hydrostatic test pressure that is not less than 1.5 times the design pressure.
    - b. After hydrostatic test pressure has been applied for 10 minutes, examine joints for leakage. Remake leaking joints using new materials and repeat hydrostatic test until no leaks exist.
  - 3. Test conduit as follows:
    - a. Seal vents and drains and subject conduit to 15 psig for four hours with no loss of pressure. Repair leaks and retest as required.
- E. Prepare test and inspection reports, and submit reports to owner.

END OF SECTION